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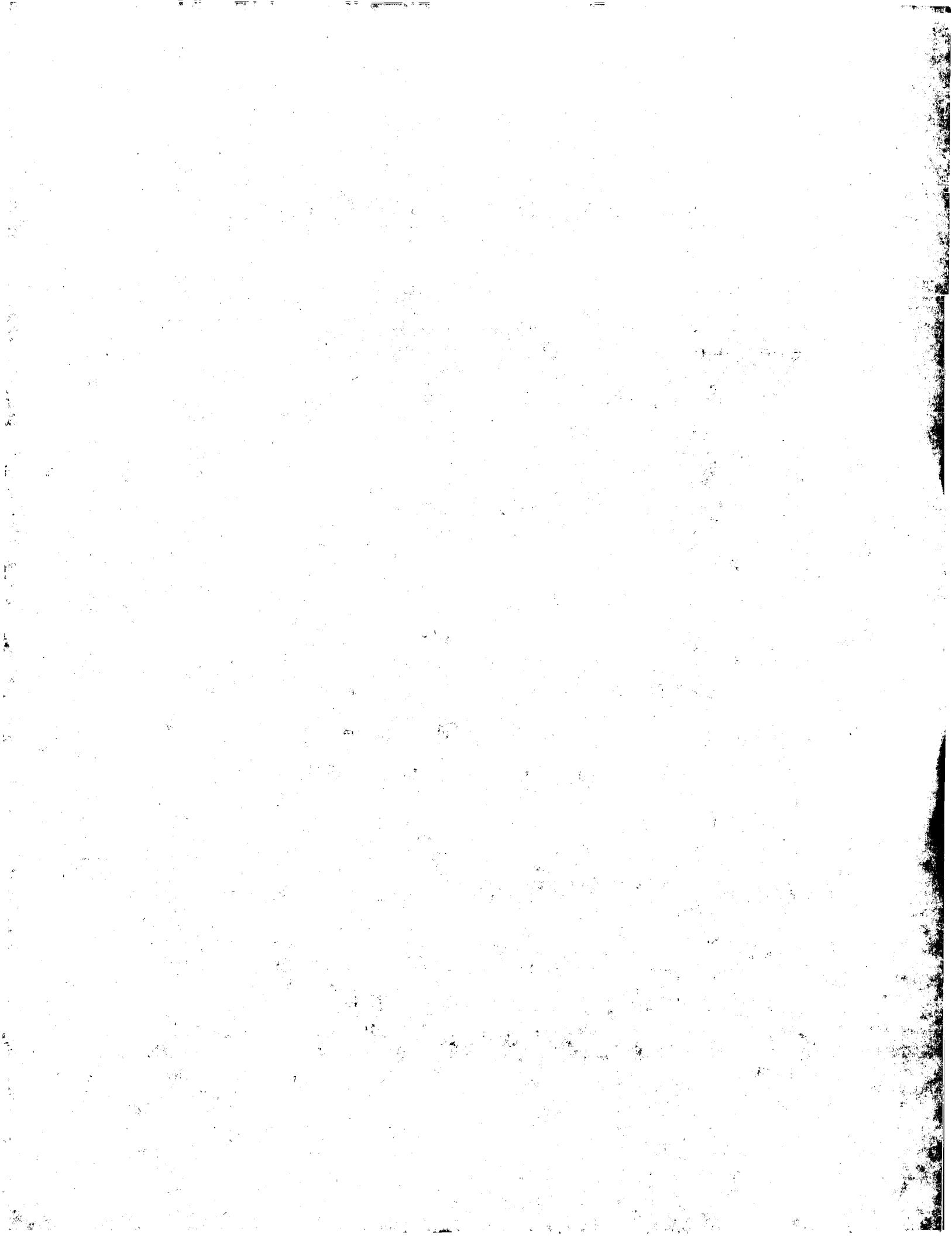
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PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Wynn Peter Holloway
Serial No: 10/621,477
Filed: 07/17/2003
For: BUILDING PANEL

Examiner:
Art Unit:
Docket No: P432
December 22, 2003

Mail Stop: Missing Parts
Commissioner for Patents
P O Box 1450
Alexandria, Va 22313-1450

TRANSMITTAL OF CERTIFIED PRIORITY DOCUMENT

Enclosed herewith is a certified copy of Application No. GB 02 16699.9
which is the priority document for the above referenced patent application.

Please place this document in the above referenced file for compliance
with 37 CFR 1.55(a).

Respectfully submitted,

Paul E. Milliken
Attorney for Applicant

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Massillon, OH 44646-1676

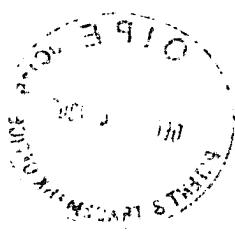
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Paul E. Milliken

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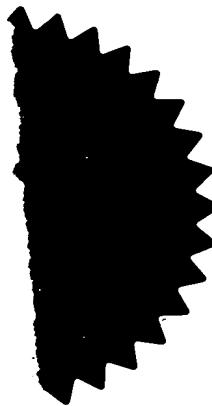
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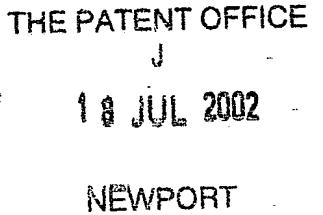
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Dated 18 July 2003



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The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

P432

2. Patent application number

(The Patent Office will fill in this part)

0216699.9

18 JUL 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Wynn Peter HOLLOWAY
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Sibford Gower
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OX15 5RS

Patents ADP number (if you know it) 8427676001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

A Building Panel

5. Name of your agent (if you have one)

Michael Stanley & Co.
P.O. Box 270
Banbury
Oxfordshire
OX15 5YY

Patents ADP number (if you know it) 704695001

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Country

Priority application number
(if you know it)Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

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- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
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Description 11

Claim(s)

45
8

Abstract

no

Drawing(s)

34-14

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11. I/We request the grant of a patent on the basis of this application.

Signature



Date

15/7/82

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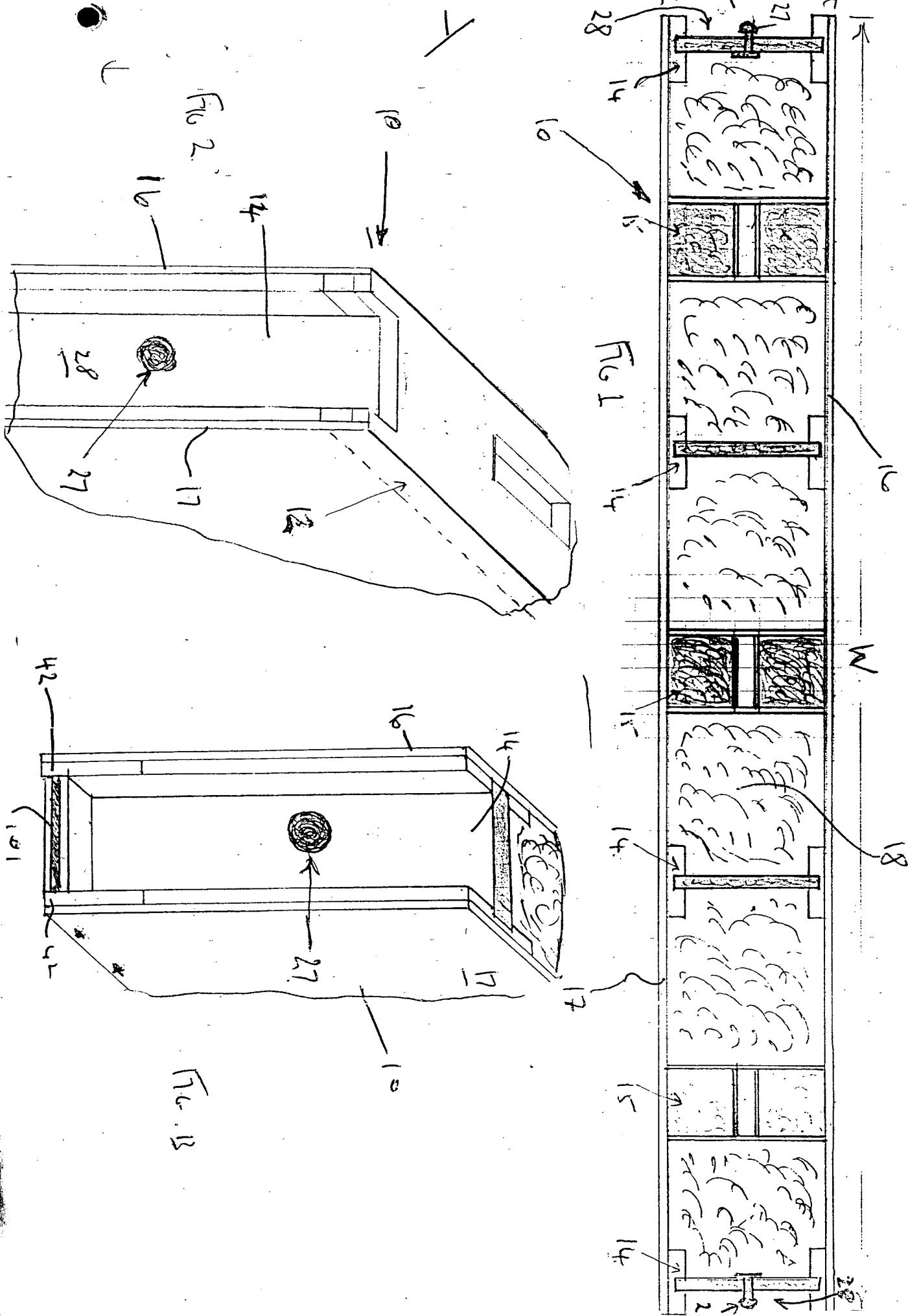
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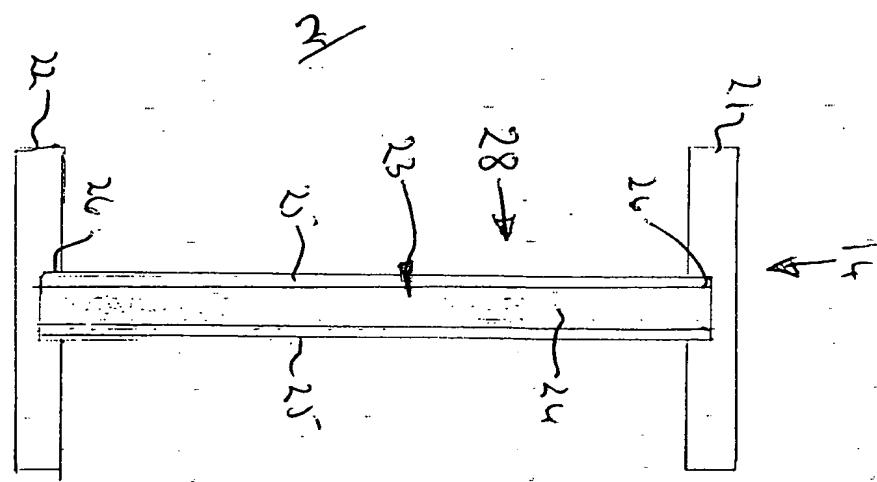


Fig. 3

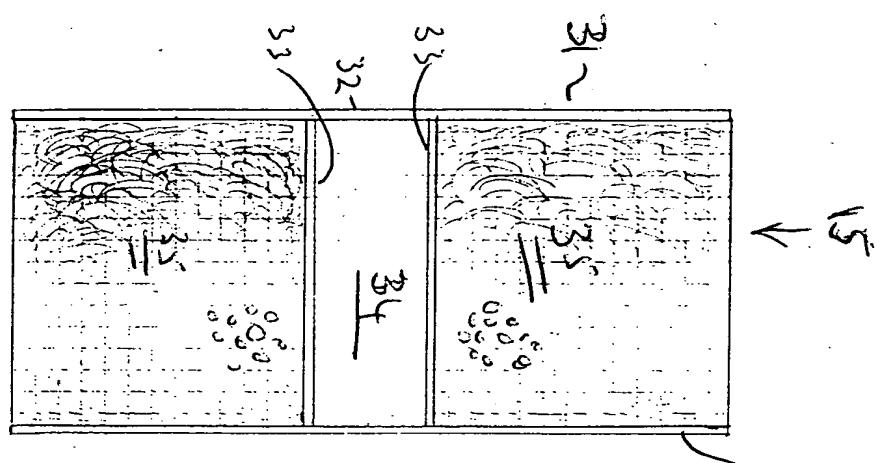


Fig. 4

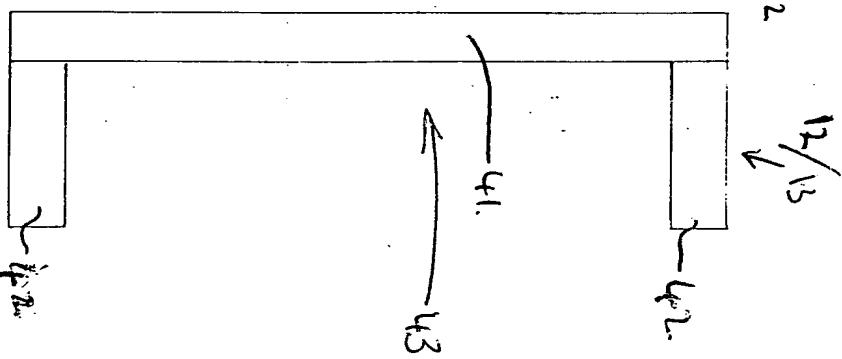


Fig. 5

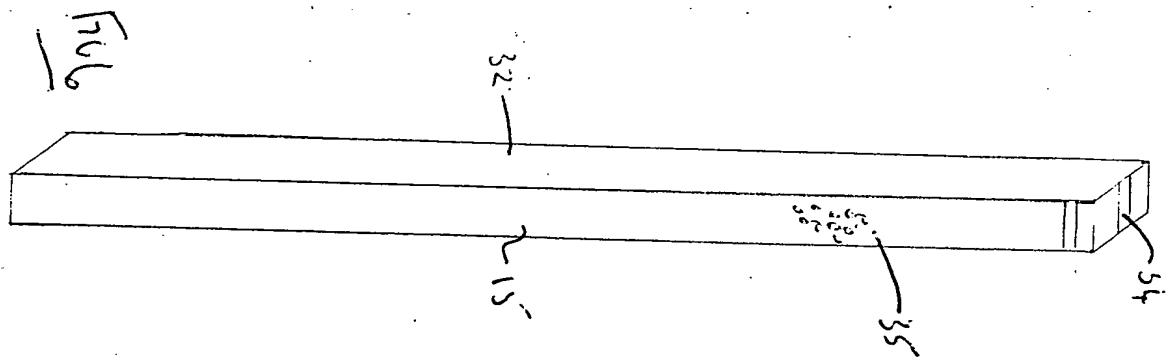
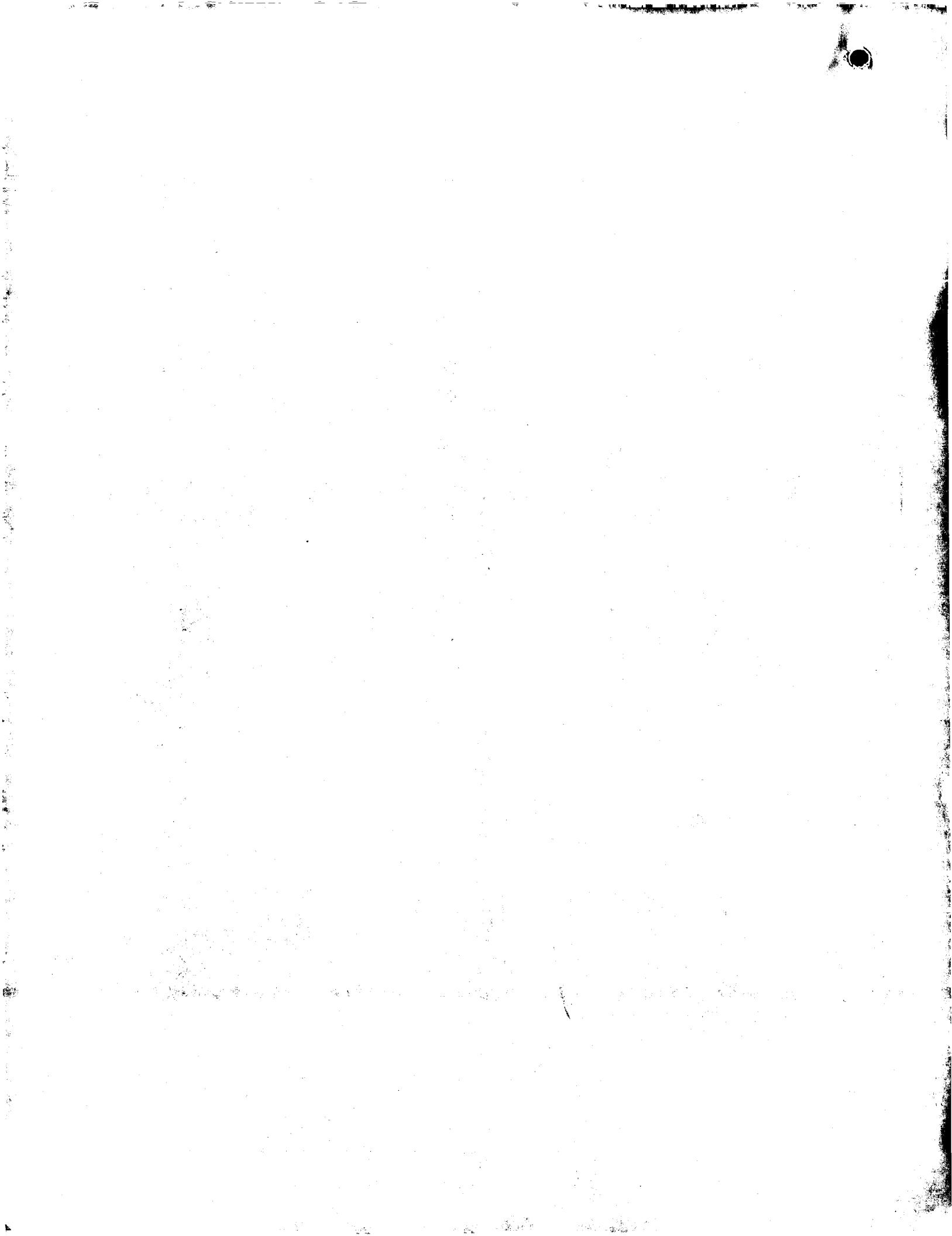
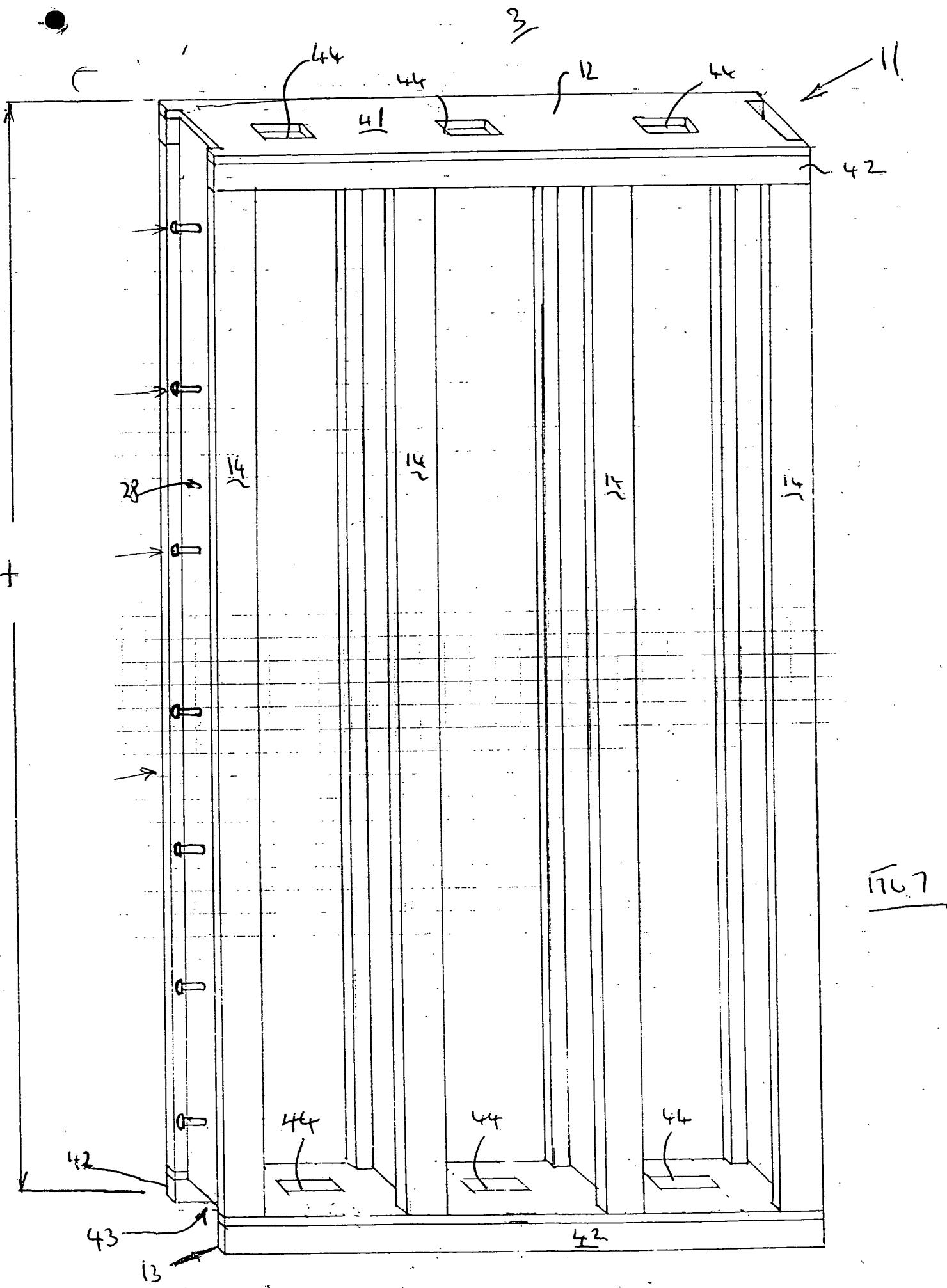
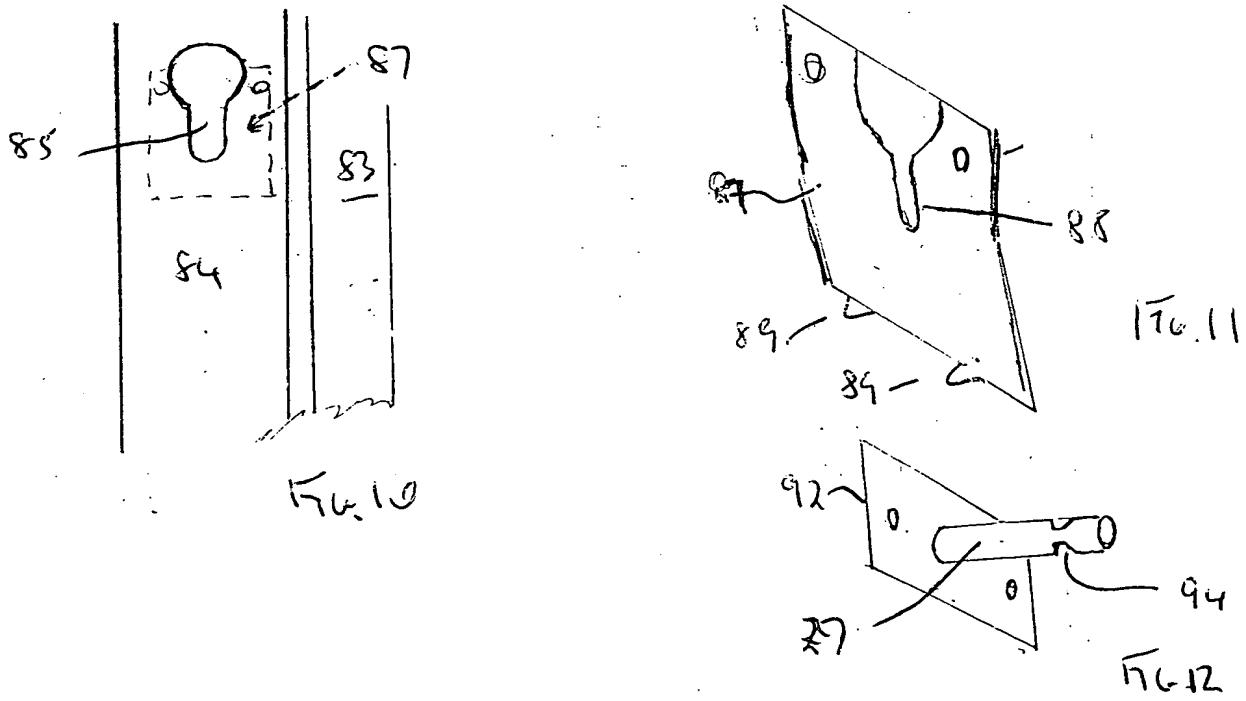
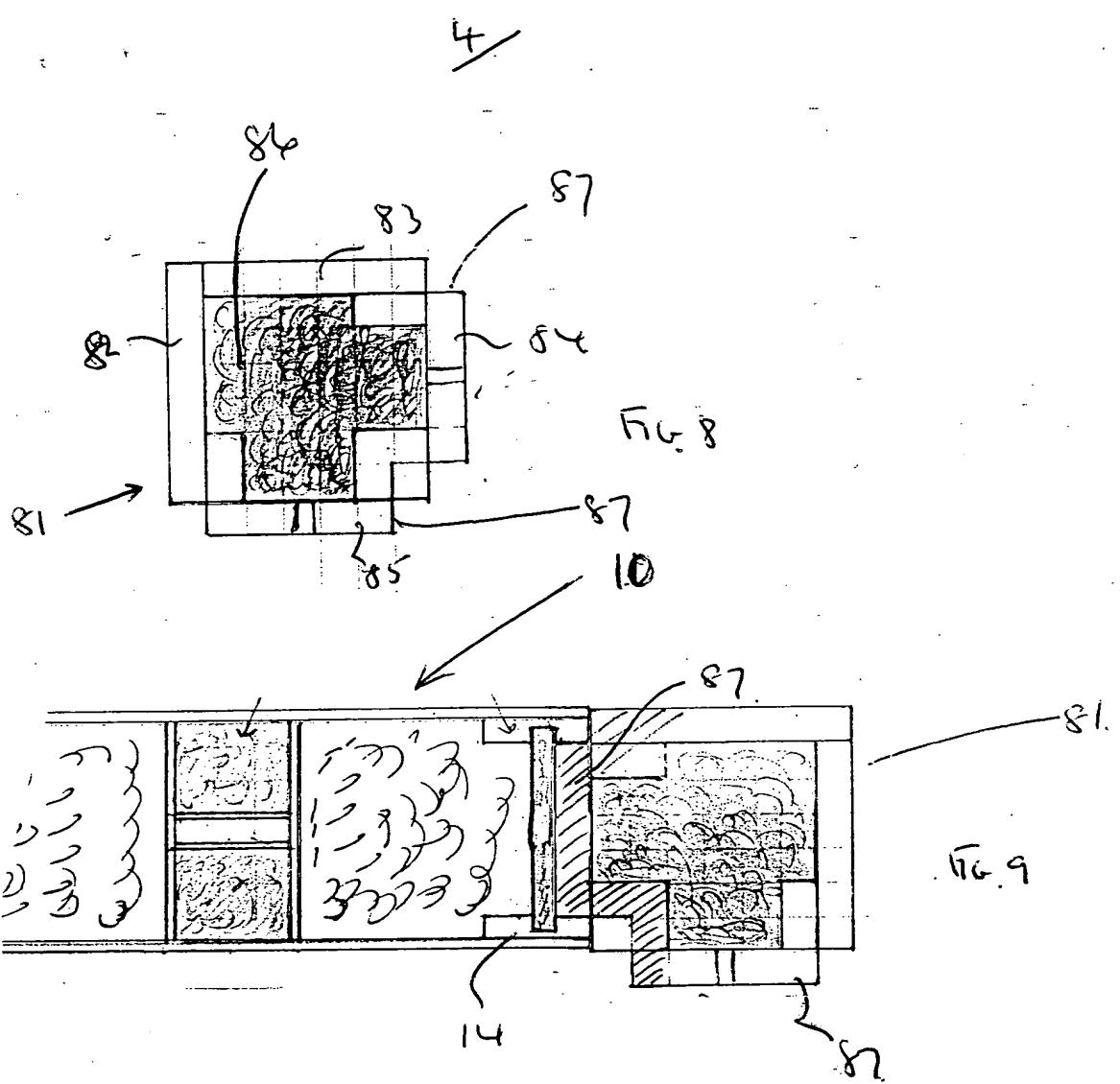


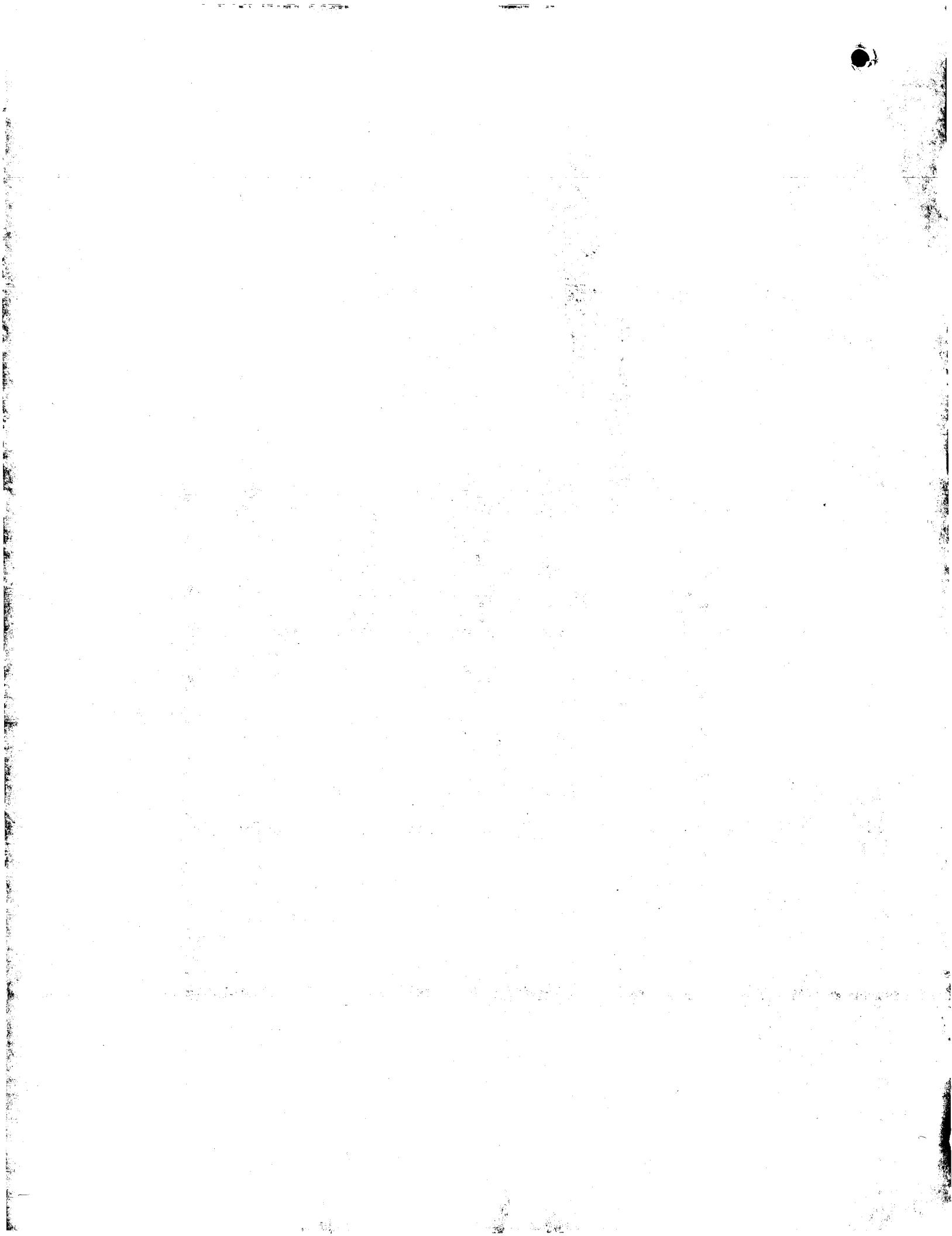
Fig. 6











A Building Panel

Field

This invention relates to modular building panels for construction of walls of buildings, in particular for use in the construction of an inner load bearing wall of a house.

Background of the Invention

The present invention relates to building construction and in particular to the construction of dwellings formed from spaced apart inner and outer walls in which the inner wall provides a load bearing structure which support the upper floors and roof structure etc., and the outer wall is formed of a weather resistant material e.g brickwork, timber cladding etc. A known construction of building is the Canadian timber frame house.

One known inner wall module is pre-assembled from a laminate of plywood, foam and plasterboard. Another known construction comprises two layers of cement fibreboard having a foam layer therebetween.

The present invention seeks to provide a load bearing wall panel which is supplied in modular form and which is dimensionally stable, and is light to handle,

Statements of Invention

According to the present invention there is provided a load bearing wall panel comprising a rectangular frame having one face covered in a water resistant board, and the other face covered in a laminated board material with an exposed plastics layer, the frame having top and bottom rails formed from "U" section water resistant composite, with the two rails being joined together by a plurality of spaced apart wood composite "I" beams extending therebetween with two of said I beams forming the sides of the frame, and the space between the faces being filled with insulation.

The term "board" includes various boards derived from timber including hardboard, cardboard, and plywood. Preferably, the said one face in use faces externally of the building and is covered OSB (oriented strand board) or plywood. Said other face in use faces internally of the building and may comprise plywood, plasterboard, or other suitable board having a finished decorative surface e.g a melamine layer laminated on its internal surface, or a laminated plastic layer suitable for decoration.

Such a panel after erection of the inner wall of a house, is substantially weather proof.

The I beams each have upper and lower flanges formed from plywood and a web comprising a rigid foam layer sandwiched between two layers of board, preferably plywood, hardboard or cardboard.

Preferably, intermediate support columns are located one between each pair of adjacent beams, each column comprising a rigid foam centre having a layer of board on each side. In a preferred arrangement, a hollow conduit extends along the middle of the column for its full length and aligns with apertures formed in either or both the top and bottom rails. The conduit is preferably rectangular and is lined on all sides by board or plywood. In use the conduits are used to accommodate wiring cable, aerial coaxial cable, pipes, plumbing etc..

The two "U section rails have substantially the same cross section, a flat base with arms extending normally therefrom with a recess therebetween, the top rail having the flat base presented outwardly of the panel and the bottom rail having the recess presented outwardly of the panel.

When constructing an internal wall for a building, in particular a load bearing wall, adjacent wall panels are linked together by posts having side portions which are engagable within the recessed sides of the I beams. The posts are formed with longitudinal tongues which are a slide fit within the recessed sides of the I beams between the flanges on the respective I-beams.

Preferably the posts are hollow having plywood sidewalls and rigid foam filled central cavity. The posts may be fixed to the panels by means of shouldered dowels secured to the I-beams engaging in aligned key-hole apertures in clips secured on the posts, preferably within the posts. The key-hole apertures are preferably each formed in a resilient tongue which is inclined internally of the post so that when a dowel is engaged in a key-hole longitudinal displacement of the post will tend to pull the post and respective panel together.

Each tongue may be formed with a lug on its upper end to both align and orientate the key-hole clips on the post with respect to the dowels on the panel.

Also according to the invention there is provided a method of constructing an internal wall of a building in which panels according to the present invention are fixed to plywood strips attached to the floor or base of a building by engaging the recessed bottom rail of each

panel over the strip and passing fasteners through the arms of the bottom rail and strip. The wall panels are then secured together using posts are described above.

Description of the Drawings

The invention will be described by way of example and with reference to the following drawings in which:

Fig. 1 is a cross section of a wall panel according to the present invention,

Fig. 2 is an isometric view of a fragment of a wall panel of Fig. 1,

Figs. 3-5 are enlarged sections of components shown in Fig. 1

Fig. 6 is an isometric view of a support column used in the wall panel

Fig. 7 is an isometric view of the frame of the wall panel with support columns omitted for reasons of clarity,

Fig. 8 is a section through a jointing post for linking together adjacent panels,

Fig. 9 shows an assembled post and panel

Fig. 10 shows a view of one side of the post,

Fig. 11 is an isometric view of an assembly clip as is used within a jointing post,

Fig. 12 is a dowel as is used with the clip and

Fig. 13 shows the method of attaching a wall panel to a floor or base.

Detailed Description of the Invention

With reference to Figs. 1 to 7, there is shown a wall panel 10 which is a module for building the internal load bearing wall of a dwelling or other building. The panel 10 has predetermined standard dimensions for matching with and assembly to other modular panels, for example width W of 1200mm, thickness T of 150mm, and height H of 2400mm. Other panels according the present invention may have difference to at least some of the above dimensions.

Each panel 10 has a rectangular frame 11, see Fig. 7 in particular, having top and bottom rails 12,13 interconnected by a plurality of I Beams 14 which form the sides and vertical struts of the frame 11 and are spaced at predetermined distances apart across the width of the panel. A preferred spacing between I beams 14 is 400mm. Support columns 15 also extend between the top and bottom rails 12,13 and are located centrally between adjacent pairs of I beams 14. The frame 11 is covered on one face, which is use faces externally of the building, with water resistant board 16 and its other face which in use faces inwardly of the building

with a second board 17. The externally facing board 16 is preferably 10-12mm plywood or OSB and the internally facing board is a laminated board which may comprise plywood, plasterboard, hardboard etc. laminated with a layer of melamine on its exposed face. The laminated layer may be provide with a finished decorative surface or may be suitable for painting or wall papering.

Referring now particularly to Fig. 3, each I beam is a composite beam having 12mm plywood flanges 21,22 with a central web 23 comprising a rigid foam layer 24 sandwiched between two thin layer 25 of plywood, hardboard, or card board. The flanges 21,22 are about 50mm in width having a central groove 26 on their inside surface to accommodate a web 23 of about 10-12 mm in thickness. The recessed longitudinally extending sides of the two I beams forming the sides of the frame 11 have dowels 27 extending outwardly therefrom, and provide a recess 28 used for assembly of adjacent panels.

With particular reference now to Figs. 4 and 6, there is shown a support column 15 which comprises a "H" section skeleton 31 having planar elongate sides 32 interconnected by a pair of spaced apart elongate cross-members 33 located about the transverse centre of the side members. The sides 32 and cross-members 33 may

be formed from 2mm plywood or other suitable material and form an enclosed cavity 34 in the middle of the column which provides a conduit extending for the length of the column. In use the conduit may accommodate electrical cable, aerial coaxial cable, pipes etc.. The outwardly facing cavities in the skeleton 11 are filled with a suitable rigid closed cell foam 35.

With reference now particularly to Fig. 5, the top and bottom rails are substantially identical and each comprise a "U" shaped section channel formed from water resistant wood composite, preferably 12mm plywood. The rails have a flat base 41 with arms 42 extending normally of the base on each side thereof to form an open sided recess 43 between the two arms. Apertures 44 are located in the base 41 for alignment with the conduits 34 formed in the columns 15. The top rail 12 has its base 41 uppermost facing outwardly of the frame 11 to provide an upper surface for the panel 10 and the recess 43 faces inwardly to receive stepped end portions of the I-beams 14 and columns 15. The bottom rail 13 also has its base 41 uppermost with the recess 43 facing downwards and outwardly of the frame 11.

The interior of the panel 10 is filled with a insulating material 18 such as Rockwool.

With reference now to Figs 8-11, adjacent panels are linked together using a jointing post 81 in this example for joining two panels normally of each other to form a corner. The jointing post is box section comprising sidewalls 82-85 formed from plywood and a hollow centre filled with rigid closed cell foam 86. The sides of the post 81 adjacent the panel, in this case sides 84, 85, are formed with an projecting tongue 87 located centrally of its respective side and extending longitudinally of the post. As can be seen in Fig. 9 one tongue 87 is accommodated in a recessed side 28 of an I beam 14 fitted to the post 81. It will be appreciated that panels may be located against both tongues. Joining posts may be provided with tongues on one or more sides as is desired and opposite sides of the posts as well as adjacent sides.

Each tongue 84 and 85 is provide with a plurality of key-hole shaped apertures 86 which in use accommodate passage of the dowels 27 on the panels 11 (see Fig. 7). On the inner surfaces of the post behind each aperture 86, there is located an assembly clip 87 which is aligned with the aperture. The clips 87 co-operate with the dowels 27 to secure wall panels and posts together. Each clip 87 is formed from spring steel and includes a

second key hole shaped aperture 88 which engages a respective dowel 27. The upper portion of the clip sits against the inside surface of the post and the lower portion of the clip is inclined away from the inner surface. The lower portion is provided with abutments 89 to space the end of the lower portion away from the inner surface.

A dowel 27 is shown in Fig. 12 and has a plate 92 for mounting on the inner side of the web 23 of an I beam 14. The dowel 27 has a groove 94 providing a shoulder which co-operates with the key hole aperture 88.

In use a post may be provided with an alignment lug or mark which locates against the top rail 12 of a panel to align each dowel 27 with the respective upper portions of keyholes 85 & 88 to allow the post to be inserted into a recess 28 of the I beam 15 forming the side of the frame 11. A second or other panel can be assembled in like manner to the other tongue 87 on the post. The post is then driven downwards to engage the shoulder 94 of the dowel with the narrow part of each keyhole 88 in the clip. Since the lower portions of the clips 87 are inclined to the inside of the post this will pull the adjacent beams towards each other and the resilience in the clip locks the panels and post together.

With reference to Fig. 13, a wall panel 10 are mounted to a floor or base by the use of a mounting strip 101. The strip 101 has a height or thickness slightly in excess of the depth of the recess 43 in the bottom rail. The recess 43 within the bottom rail 13 of each panel can slidably located over the strip 101 which has previously been secured to the floor. Nails or other fixings can then be used to secure the panel to the floor strip.

If desired, wall panels 10 may be placed on top previously assembled walls. A strip similar to the strip 101 is utilised by having apertures therein that align with the apertures 44 in top and bottom rails 12 & 13. In this manner, assembled walls may be provided with service conduits within the walls that extend from the top of a house to the bottom. By using wall modules of different widths the vertical joints between adjacent wall panels in one layer of panels may be offset relative to the vertical joints in another layer.

The posts 81 may be provided with inter engaging elements at their top and bottom ends so that the posts can interlock vertically with each other.

Claims

1. A load bearing modular wall panel comprising a rectangular frame having one face covered in a water resistant board, and the other face covered in a laminated board material, the frame having top and bottom rails formed from "U" section water resistant composite, with the two rails being joined together by a plurality of spaced apart wood composite "I" beams extending therebetween with two of said I beams forming the sides of the frame, and the space between the faces being filled with thermal insulation.

2. A panel as claimed in Claim 1 wherein said one face in use faces externally of the building and is made from OSB (oriented strand board).

3. A panel as claimed in Claim 1 or Claim 2 wherein said other face in use faces internally of the building and may comprises board having a decorative layer laminated on its internal surface.

4. A panel as claimed in any one of Claims 1 to 3 wherein the I beams have upper and lower flanges formed from plywood and a web comprising a rigid foam layer sandwiched between two layers of board.

5. A panel as claimed in any one of Claims 1 to 4 wherein intermediate support columns extending between the two rails are located one between each pair of adjacent beams, each column comprising a rigid foam centre having a layer of board on each side.

6. A panel as claimed in Claim 5 wherein at least some of said columns have a hollow conduit extending along the middle of the column for its full length, the conduit aligning with apertures formed in either or both the top and bottom rails.

7. A panel as claimed in Claim 6 wherein the hollow conduits are rectangular and are lined on all sides by board.

8. A panel as claimed in Claim 7 wherein the two "U section rails have substantially the same cross section, a flat base with arms extending normally thereof with a cavity therebetween, the top rail having the flat base presented outwardly of the panel and the bottom rail having the hollow cavity presented outwardly of the panel.

9. An internal wall for a building comprises adjacent wall panels according to any one of claims 1 to 8 and

which are linked together by posts having side portions which are engagable within the recessed sides of the I beams.

10. A wall as claimed in Claim 9 wherein the posts are formed with longitudinal tongues which are a slide fit within the recessed sides of the I beams.

11. A wall as claimed in Claim 10 wherein the posts are hollow having plywood sidewalls and a rigid foam filled central cavity.

12. A wall as claimed in any one of Claim 9 to 11 wherein the posts may be fixed to the panels by means of shouldered dowels secured to the I-beams engaging in aligned key-hole apertures on clips secured on the posts.

13. A wall as claimed in Claim 12 when dependant upon Claim 11 wherein the clips are located within the cavity.

14. A wall as claimed in Claim 13 wherein each key-hole aperture is formed in resilient tongue inclined internally of the post so that when a dowel is engage in

a key-hole, longitudinal displacement of the post will tend to pull the post and respective panel together.

15. A wall as claimed in Claim 14 wherein on each post, each tongue is formed with a lug at its upper end to both align and orientate the key-hole clips on the post with respect to the dowels on the panel.

16. A method of constructing an internal wall of a building in which panels according to any one of claims 1 to 8 are fixed to plywood strips attached to a base of a building by engaging the recessed bottom rail over the strip and passing fasteners through the arms of the bottom rail and strip.

17. A method of constructing an internal wall of a building in which wall panels according to any one of claims 1 to 8 are linked together by posts having side portions which are engagable within the recessed sides of the I beams

18. A method as claimed in Claim 17 wherein the posts are fixed to the panels by means of shouldered dowels secured to the I-beams engaging in aligned key-hole apertures on clips secured on the posts.

19. A method as claimed in any one of Claims 16 to 18, wherein panels may be assembled vertically with the bottom rail of at least one upper panel engaging a intermediate plywood strip attached to the top rail of at least one lower panel.

20. A method as claimed in Claim 19 when dependant upon Claim 6 wherein said intermediate strip has apertures therein that align with the apertures in the top and bottom rails of said panels, forming conduits that run vertically through the walls.